



# **American Community Survey (ACS)**

## *Public Use Microdata Samples (PUMS)*

February 17, 2016

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American Community Survey Office

# Outline

- **PUMS Overview**
- PUMS Geography
- Accessing PUMS Data
- Common Questions
- Documentation and Guidance Resources

# Why Use PUMS?

SEX BY SCHOOL ENROLLMENT BY EDUCATIONAL ATTAINMENT BY  
EMPLOYMENT STATUS FOR THE POPULATION 16 TO 19 YEARS  
Universe: Population 16 to 19 years ⓘ  
2010-2014 American Community Survey 5-Year Estimates

- Data needed are not supported by standard tables
  - Example: narrower categories (“16 to 17 years” “18 years”)
- Users want to conduct sophisticated statistical analysis
  - Example: correlation analysis (age, employment, and language)
- Can create new measures
  - Example: looking at person and household variables together (new variable: presence of working teenager in a household)

# What are PUMS files?

## Public Use Microdata Sample



The title 'Public Use Microdata Sample' is broken down into three parts by a horizontal line with three downward-pointing brackets. The first bracket is under 'Public Use', the second is under 'Microdata', and the third is under 'Sample'.

### Anonymized

#### Downloadable

- SAS and CSV
- AFF, FTP, DataFerrett

### Individual Responses

- Must be tabulated and weighted by user

### Representative Sample of the Population

- 1-year (1%)
- 5-year (5%)

# Summary Data vs. Microdata

## What's the Difference?

	Maryland	
	Estimate	Margin of Error
Total:	5,887,776	*****
Male:	2,851,238	+/-544
Under 18 years:	687,884	+/-514
Native	657,483	+/-1,504
Foreign born:	30,401	+/-1,362
Naturalized U.S. citizen	7,636	+/-691
Not a U.S. citizen	22,765	+/-1,131
18 years and over:	2,163,354	+/-385
Native	1,786,172	+/-3,487
Foreign born:	377,182	+/-3,416
Naturalized U.S. citizen	174,573	+/-2,242
Not a U.S. citizen	202,609	+/-3,246

**Aggregated tables for a geography:**  
 “In MD, 174,573 adult males are naturalized citizens.”

RT	SERIALNO	SPORDER	AGEP	CIT	SEX
P	20100000000005	1	37	1	1
P	20100000000005	2	36	1	2
P	20100000000005	3	9	1	1
P	20100000000005	4	7	1	1
P	20100000000005	5	0	1	2
P	20100000000007	1	58	4	1
P	20100000000007	2	17	1	1
P	20100000000007	3	13	1	2
P	20100000000007	4	47	4	1
P	20100000000007	5	18	1	2

**Individual responses:**  
 “This 58-year-old adult male in MD is a naturalized citizen.”

# Summary Data vs. Microdata

## Pros and Cons

	Summary Data (ex: AFF)	Microdata (ex: PUMS)
<i>Format</i>	Published tables designed by Census analysts (weighted with margins of error)	Sample of household and individual responses to questionnaire (and some recoded variables)
<i>Benefits</i>	Easy to use Small geographies	Enables custom tables and analyses More variable detail available
<i>Limitations</i>	Fixed content : <ul style="list-style-type: none"> <li>• categories</li> <li>• years</li> <li>• Topic combinations</li> </ul>	More complex to use Smaller sample (larger Margins of Error) Edits to protect privacy <ul style="list-style-type: none"> <li>• top coding</li> <li>• broader categories</li> </ul> No geographies smaller than PUMAs

# PUMS Availability

- We release 2 new PUMS files every year
  - 1-year PUMS (example: 2014 1-year PUMS)
    - October
  - 5-year PUMS (example: 2010-2014 5-year PUMS)
    - January
- Some documentation released the week prior

# Multiyear (5-year) PUMS Files

- 5-year PUMS files contain the same cases as their component 1-year files

2010 ACS 1-year PUMS

2011 ACS 1-year PUMS

2012 ACS 1-year PUMS = 2010-2014 ACS 5-year PUMS

2013 ACS 1-year PUMS

2014 ACS 1-year PUMS

- Why do we release multiyear PUMS?
  - New weights are produced using latest population estimate “vintages”
  - Coding schemes and dollar amounts are standardized to current year



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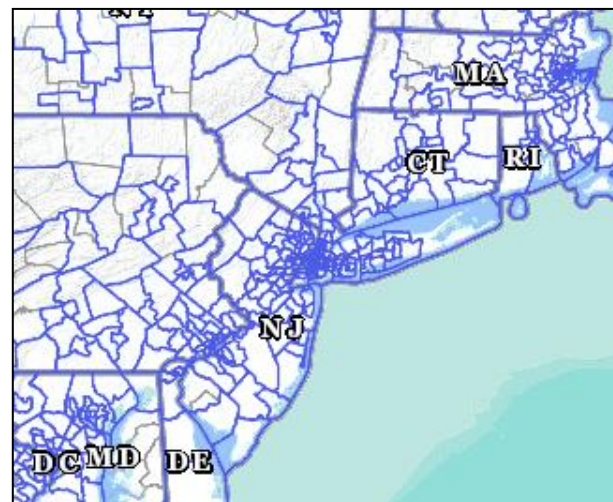
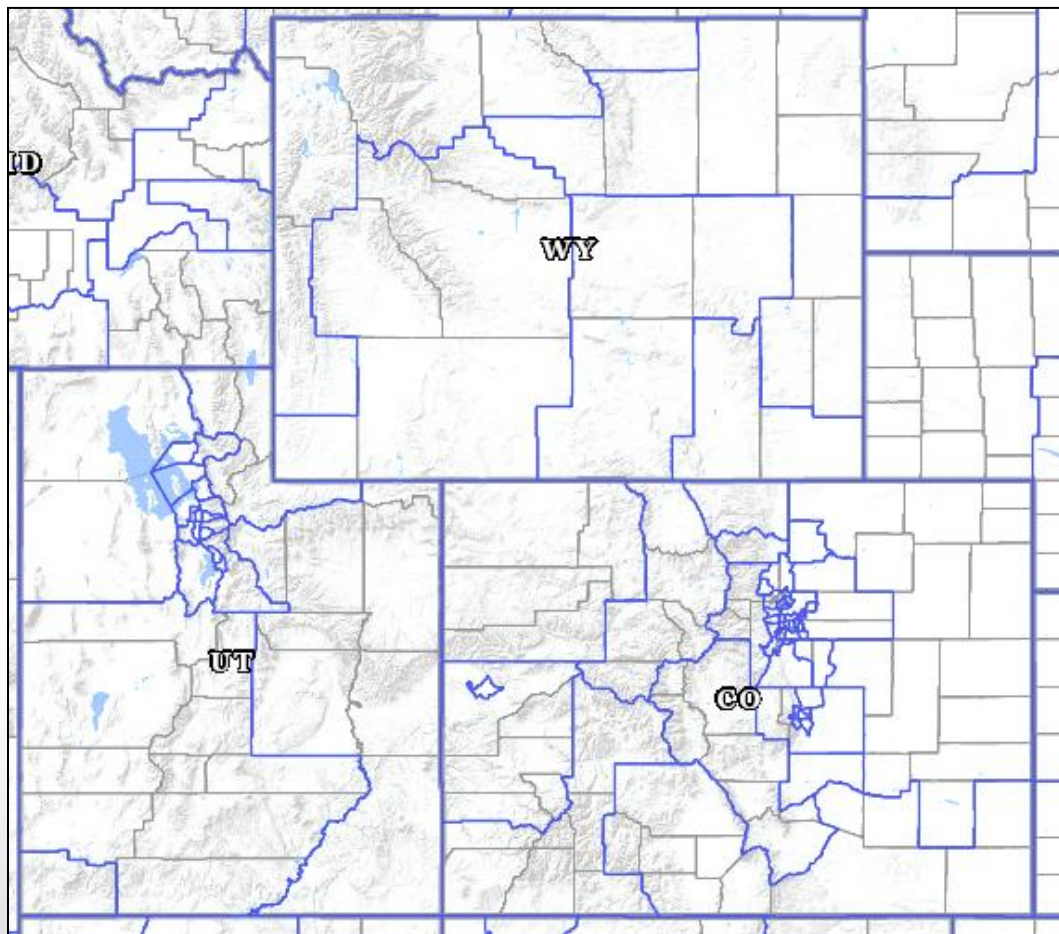
# Limited Geographic Detail

- Region, division, state, PUMA *only*
  - PUMAs can identify most cities of 100,000+ and many metropolitan areas, but not all
- PUMS is **not** designed for statistical analysis of small geographic areas

# Public Use Microdata Area (PUMA)

- An area with 100,000+ population
- Identified by five-digit code (unique within each state)
- Nest within states or equivalent entities
- Geographically contiguous
- Defined after each census by states and the Census Bureau's Geography Division
  - 2010 Census PUMAs first used in the 2012 ACS
  - Multiyear files contain dual PUMA vintages

# Public Use Microdata Area (PUMA) Maps



Missouri Census Data Center's [MABLE](http://mcdc.missouri.edu/websas/geocorr14.html), can be used to calculate the proportion of a PUMA's population in other geographies and to identify PUMA code(s) for areas of interest.

<http://mcdc.missouri.edu/websas/geocorr14.html>

<http://www.census.gov/geo/maps-data/maps/reference.html>

<http://tigerweb.geo.census.gov/tigerweb/>

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# American FactFinder

### Your Selections

**Search using...**

Search:  
PUMS ✕

[Clear all selections and start a new search](#)

[load search](#) | [save search](#)

### Search using the options below:

**Topics**  
(age, income, year, dataset, ...)

**Geographies**  
(states, counties, places, ...)

**Race and Ethnic Groups**  
(race, ancestry, tribe)

**Industry Codes**  
(NAICS industry, ...)

**EEO Occupation Codes**  
(executives, analysts, ...)

### Search Results: 1-25 of 53 tables and other products match 'Your Selections'

Refine your search results:

topic or table name:  state, county or place (optional):  [GO](#) [?](#)


☒ topics
 ☐ race/ancestry
 ☐ industries
 ☐ occupations

Selected: [View](#) | [Download](#) | [Compare](#) | [Clear All](#) | [Reset Sort](#) [?](#)

	ID	Table, File or Document Title	Dataset	About
<input type="checkbox"/>	PUMS-CSV	2010-2014 ACS 5-year Public Use Microdata Samples (PUMS) - CSV format	2014 ACS 5-year estimates	<a href="#">i</a>
<input type="checkbox"/>	PUMS-CSV	2014 ACS 1-year Public Use Microdata Samples (PUMS) - CSV format	2014 ACS 1-year estimates	<a href="#">i</a>
<input type="checkbox"/>	PUMS-SAS	2010-2014 ACS 5-year Public Use Microdata Samples (PUMS) - SAS format	2014 ACS 5-year estimates	<a href="#">i</a>
<input type="checkbox"/>	PUMS-SAS	2014 ACS 1-year Public Use Microdata Samples (PUMS) - SAS format	2014 ACS 1-year estimates	<a href="#">i</a>
<input type="checkbox"/>	PUMS-CSV	2009-2013 ACS 5-year Public Use Microdata Samples (PUMS) - CSV format	2013 ACS 5-year estimates	<a href="#">i</a>
<input type="checkbox"/>	PUMS-CSV	2011-2013 ACS 3-year Public Use Microdata Samples (PUMS) - CSV format	2013 ACS 3-year estimates	<a href="#">i</a>
<input type="checkbox"/>	PUMS-CSV	2013 ACS 1-year Public Use Microdata Samples (PUMS) - CSV format	2013 ACS 1-year estimates	<a href="#">i</a>
<input type="checkbox"/>	PUMS-SAS	2009-2013 ACS 5-year Public Use Microdata Samples (PUMS) - SAS format	2013 ACS 5-year estimates	<a href="#">i</a>
<input type="checkbox"/>	PUMS-SAS	2011-2013 ACS 3-year Public Use Microdata Samples (PUMS) - SAS format	2013 ACS 3-year estimates	<a href="#">i</a>
<input type="checkbox"/>	PUMS-SAS	2013 ACS 1-year Public Use Microdata Samples (PUMS) - SAS format	2013 ACS 1-year estimates	<a href="#">i</a>

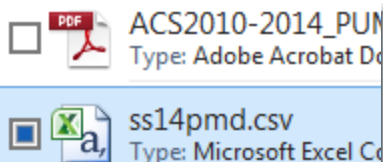
<http://factfinder.census.gov>

# American FactFinder (cont'd)

2010-2014 ACS 5-year Public Use Microdata Samples (PUMS) - CSV format   
2010-2014 ACS 5-year estimates

United States Population Records	United States Housing Unit Records
Alabama Population Records	Alabama Housing Unit Records
Alaska Population Records	Alaska Housing Unit Records
Arizona Population Records	Arizona Housing Unit Records
Arkansas Population Records	Arkansas Housing Unit Records
California Population Records	California Housing Unit Records
Colorado Population Records	Colorado Housing Unit Records
Connecticut Population Records	Connecticut Housing Unit Records
Delaware Population Records	Delaware Housing Unit Records
District of Columbia Population Records	District of Columbia Housing Unit Records
Florida Population Records	Florida Housing Unit Records

csv\_pmd.zip



ss14pmd

	A	B	C	D	E	F	G	H	I	J
1	RT	SERIALNO	SPORDER	PUMA00	PUMA10	ST	ADJINC	PWGTP	AGEP	CIT
2	P	20100000000005	1	1201	-9	24	1094136	14	37	
3	P	20100000000005	2	1201	-9	24	1094136	16	36	
4	P	20100000000005	3	1201	-9	24	1094136	17	9	
5	P	20100000000005	4	1201	-9	24	1094136	17	7	
6	P	20100000000005	5	1201	-9	24	1094136	16	0	
7	P	20100000000007	1	1002	-9	24	1094136	23	58	
8	P	20100000000007	2	1002	-9	24	1094136	20	17	
9	P	20100000000007	3	1002	-9	24	1094136	26	13	
10	P	20100000000007	4	1002	-9	24	1094136	26	47	
11	P	20100000000007	5	1002	-9	24	1094136	34	18	

ss14pmd



# Census Bureau FTP Site

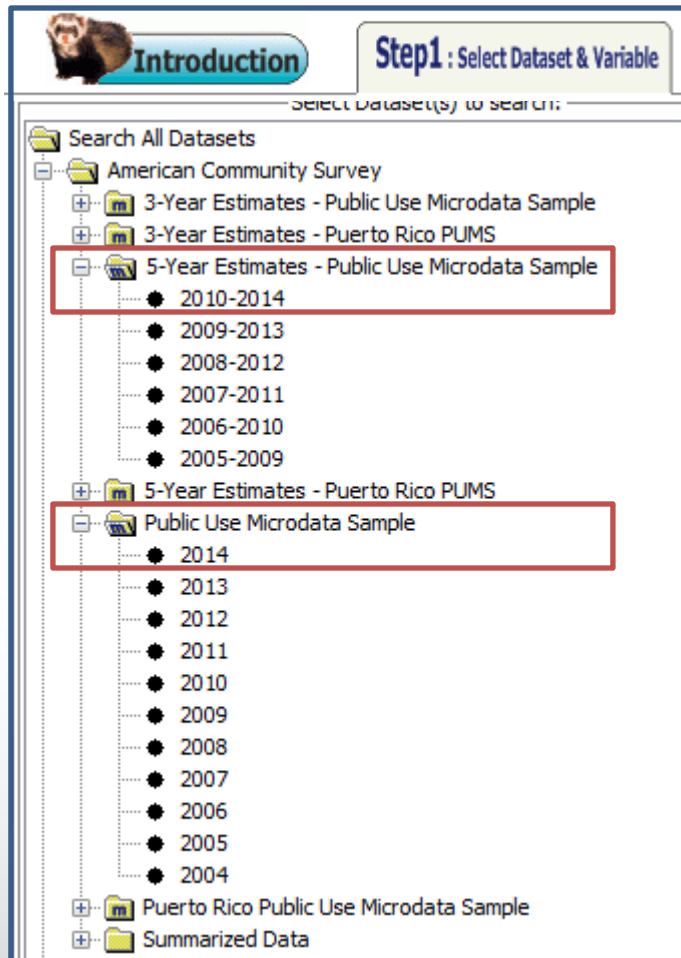
United States Census Bureau			
Name	Last modified	Size	Description
Parent Directory	-	-	-
1996/	06-Aug-2003 13:41	-	-
1997/	06-Aug-2003 13:42	-	-
1998/	06-Aug-2003 13:42	-	-
1999/	06-Aug-2003 13:42	-	-
2000/	25-Oct-2012 09:15	-	-
2001/	25-Oct-2012 09:14	-	-
2002/	25-Oct-2012 09:14	-	-
2003/	25-Oct-2012 09:14	-	-
2004/	25-Oct-2012 09:13	-	-
2005/	25-Oct-2012 09:13	-	-
2006/	26-Oct-2007 11:19	-	-
2007/	23-May-2015 11:29	-	-
2008/	23-May-2015 19:20	-	-
2009/	23-May-2015 19:51	-	-
2010/	23-May-2015 20:14	-	-
2011/	24-May-2015 07:10	-	-
2012/	24-May-2015 14:36	-	-
2013/	24-May-2015 14:57	-	-
2014/	21-Jan-2016 00:01	-	-

United States Census Bureau			
		Topics	G
		Population, Economy	Ma
Name	Last modified	Size	Description
Parent Directory	-	-	-
PUMS_file_naming_convention.pdf	07-Jan-2016 13:21	36K	-
csv_hak.zip	07-Jan-2016 10:54	2.4M	-
csv_hal.zip	07-Jan-2016 10:54	16M	-
csv_har.zip	07-Jan-2016 10:54	9.9M	-
csv_haz.zip	07-Jan-2016 10:53	21M	-
csv_hca.zip	07-Jan-2016 10:53	101M	-
csv_hco.zip	07-Jan-2016 10:50	16M	-
csv_hct.zip	07-Jan-2016 10:49	11M	-
csv_hdc.zip	07-Jan-2016 10:49	2.4M	-
csv_hde.zip	07-Jan-2016 10:49	3.2M	-

<http://www2.census.gov/programs-surveys/acs/data/pums/>



# DataFerrett



- Menu driven system doesn't require users to have (or know how to use statistical software (i.e. SAS, STATA, SPSS, etc.)
- Can download specific variables only
- Create variable recodes

<http://dataferrett.census.gov/>

# DataFerrett Assistance

## Video Tutorials



### Creating ACS Custom Tables Using DataFerrett - Part 1

May 09, 2014

Part 1 of this tutorial will show you how to make an ACS custom table using DataFerrett, the Census Bureau's free data analysis and extraction tool.

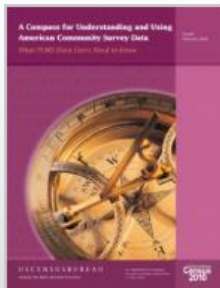


### Creating ACS Custom Tables Using DataFerrett - Part 2

May 09, 2014

Part 2 of this tutorial will show you how to change the geography displayed from the default, United States, to a geography that you select.

<http://www.census.gov/programs-surveys/acs/technical-documentation/pums/dataferrett.html>



## What Public Use Microdata Sample (PUMS) Data Users Need to Know (pages 12-23)






<http://www.census.gov/library/publications/2009/acs/pums.html>

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# How do I put PUMS files together?

- National level files must be released in pieces that users download and concatenate.
- Housing variables and person variables are separated
- Users must merge housing and person files (using SERIALNO variable as the matching variable)
- Example code is in the PUMS ReadMe and on the PUMS File Structure page

	ACS2010-2014_PUMS_README.pdf Type: Adobe Acrobat Document
	ss14pusa.csv Type: Microsoft Excel Comma Separated Values File
	ss14pusb.csv Type: Microsoft Excel Comma Separated Values File
	ss14pusc.csv Type: Microsoft Excel Comma Separated Values File
	ss14pusd.csv Type: Microsoft Excel Comma Separated Values File

```
data population;  
set psam_pusa psam_pusb;  
run;  
  
data combined; merge  
population (in=pop) housing;  
by serialno;  
if pop;  
run;
```

<http://www.census.gov/programs-surveys/acs/technical-documentation/pums/filestructure.html>

# Which weight should I apply?

A weight defines how many persons and housing units one PUMS sample interview represents

- **WGTP: PUMS household weights**
  - used to produce housing unit estimates
- **PWGTP: PUMS person weights**
  - used to produce population estimates
- **WGTP1 – WGTP80, PWGTP1 – PWGTP80: PUMS Replicate Weights**
  - used to calculate standard errors

# Why don't my PUMS estimates match AFF?

Estimates generated with PUMS microdata will be slightly different from AFF estimates:

- PUMS files include only about two-thirds of the cases that were used to produce estimates on American FactFinder
- PUMS files include additional edits

When data users have doubts about their PUMS estimates, they should attempt to reproduce the PUMS Estimates for User Verification, available on the Technical Documentation page.

<http://www.census.gov/programs-surveys/acs/technical-documentation/pums/documentation.html>

# How Do I Use Dual Vintage PUMAs?

Two sets of PUMA codes on 5-year files:

- Census 2000 PUMAs
- 2010 Census PUMAs

ACS PUMS does not use overlapping geographies for any record.

Estimate of 4-yr-olds in a city (2010-2014 ACS 5-year PUMS):

4-year-olds in the 2000 PUMAs (in 2010 & 2011 records): X

4-year-olds in the 2010 PUMAs (in 2012-2014 records): Y

Add these two figures:

4-year-olds in the fuzzy PUMAs:  $(X+Y)$

<http://www.census.gov/programs-surveys/acs/technical-documentation/pums/documentation.html>

# Use Caution...


- Be careful using estimates based on a small handful of cases. To obtain more cases, use multiyear files or combine geographic areas.
- Extreme values are masked to avoid disclosure. Some variables will be especially affected:
  - Dollar-amount variables (all kinds of income, mortgage, rent, utilities, property taxes, home value, property insurance costs)
  - Number of rooms and bedrooms
  - Age
  - Travel time to work, hours worked



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# ACS Main Page



[Topics](#)  
Population, Economy

[Geography](#)  
Maps, Geographic Data

[Library](#)  
Infographics, Publications

[Data](#)  
Tools, Developers

[About the Bureau](#)  
Research, Surveys

[Newsroom](#)  
News, Events, Blogs

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[Respond to the Survey](#)

[News & Updates](#)

[Data](#)

[Guidance for Data Users](#)

[Geography & ACS](#)

[Technical Documentation](#)

[Methodology](#)

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[Operations and Administration](#)

[Contact Us](#)

The American Community Survey helps local officials, community leaders and businesses understand the changes taking place in their communities. It is the premier source for detailed information about the American people and workforce.



What is the ACS?



How do I respond to the ACS?



Where can I get ACS data?

[Data](#)[News](#)[Events](#)[Library](#)

Respond to the ACS.  
[Learn how.](#)

[census.gov/acs](https://census.gov/acs)

# PUMS Data Page

About the Survey

Respond to the Survey

News & Updates

**Data**

Data Tables & Tools

Data via FTP

Summary File Data

**PUMS Data**

Race/Ethnicity & AIAN  
Data

Custom Tables

Guidance for Data  
Users

Geography & ACS

Technical  
Documentation

Methodology

Library

Operations and  
Administration

Contact Us

## PUMS Data



Supporting documentation for the data below is available on the [PUMS Documentation](#) page.

### PUMS Data 2000 - current

Available through the American FactFinder website

[2010-2014 ACS 5-year PUMS](#)

[2014 ACS 1-year PUMS](#)

[2009-2013 ACS 5-year PUMS](#)

[2011-2013 ACS 3-year PUMS](#)

[2013 ACS 1-year PUMS](#)

[2008-2012 ACS 5-year PUMS](#)

[2010-2012 ACS 3-year PUMS](#)

[2012 ACS 1-year PUMS](#)

[2007-2011 ACS 5-year PUMS](#)

### Available through the FTP site

[2004 ACS PUMS](#)

[2003 ACS PUMS](#)

[2002 ACS PUMS](#)

[2001 ACS PUMS](#)

[2000 ACS PUMS](#)

### 1996-98 PUMS Files Available on DVD

Microdata for select test areas is available on DVD.

- To request a DVD, email your name and mailing address and specify dataset (PUMS 1996-1998) to [acso.dvd.order@census.gov](mailto:acso.dvd.order@census.gov). You may be contacted for additional information before your request is filled.

<http://www.census.gov/programs-surveys/acs/data/pums.html>

# PUMS Technical Documentation

About the Survey  
Respond to the Survey  
News & Updates  
Data  
Guidance for Data Users  
Geography & ACS

## Technical Documentation

Code Lists, Definitions, and Accuracy

User Notes

Errata

Data Suppression

Table & Geography Changes

Summary File Documentation

**PUMS Documentation**

Race/Ethnicity and AIAN Release Documentation

Methodology

Library

Operations and Administration

Contact Us

About PUMS

Confidentiality of PUMS

PUMS Data

PUMS FAQs

PUMS File Structure

PUMS on DataFerrett

PUMS Technical Documentation

- **PUMS ReadMe:** Important information about 2014 geography and variable changes as well as guidance for novice ACS PUMS files users
- **Subjects in the PUMS:** A list of topics included in each of the housing and population record files
- **PUMS Data Dictionary:** Includes variables available for each PUMS release and how each variable is coded
- **PUMS Code Lists:** Detailed codes for variables that contain a large number of coded responses, such as ancestry and occupation.
- **PUMS Top Coded and Bottom Coded Values:** List of variables with responses exceeding a state specific value that are replaced with a predetermined value
- **Accuracy of the PUMS:** A basic explanation of the sample design, estimation methodology, and accuracy of the data
- **PUMS Estimates for User Verification:** A set of Census-created PUMS estimates for data users to verify their methods

<http://www.census.gov/programs-surveys/acs/technical-documentation/pums/documentation.html>

# PUMS Data Dictionary

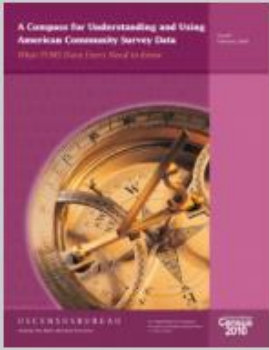
RT	SERIALNO	SPORDER	AGEP	CIT	SEX
P	20100000000005	1	37	1	1
P	20100000000005	2	36	1	2
P	20100000000005	3	9	1	1
P	20100000000005	4	7	1	1
P	20100000000005	5	0	1	2
P	20100000000007	1	58	4	1

## PERSON RECORD—PERSON VARIABLES

P	201000	AGEP	2	
P	201000	Age		
P	201000		00	.Under 1 year
P	201000		01...99	.1 to 99 years (Top-coded***)
		CIT	1	
		Citizenship status		
			1	.Born in the U.S.
			2	.Born in Puerto Rico, Guam, the U.S. Virgin Islands, or the Northern Marianas
			3	.Born abroad of American parent(s)
			4	.U.S. citizen by naturalization
			5	.Not a citizen of the U.S.

<http://www.census.gov/programs-surveys/acs/technical-documentation/pums/documentation.html>

# PUMS Resources



## What Public Use Microdata Sample Data Users Need to Know

<http://www.census.gov/library/publications/2009/acs/pums.html>

- Overview of getting and using the data
- Outdated website instructions, but concepts are sound



## ACS Public Use Microdata Samples Group on ACS Data Users Group

<http://www.acsdatausers.org/>

- Share knowledge with other PUMS users



Sign up for the ACS Public Use Microdata Sample Files alerts at  
<https://public.govdelivery.com/accounts/USCENSUS/subscriber/new>

# Source Us!

U.S. Census Bureau's [YYYY-YYYY] American Community Survey [1/3/5]-year **PUMS** [estimates/statistics/data release]



"As the topic of who bikes in Philly always seems to be a hot topic of conversation on social media, we reached out again for some further analysis of cycling demographics. Econsult researcher Caitlin Furio crunched the numbers for us from the **2008-2012 Public Use Microdata Sample (PUMS) data from the ACS...**"

[http://www.philly.com/philly/news/Who\\_bikes\\_drives\\_walks\\_or\\_rides\\_transit\\_to\\_work\\_in\\_Philly.html](http://www.philly.com/philly/news/Who_bikes_drives_walks_or_rides_transit_to_work_in_Philly.html)



"Homeownership rates are calculated from the **2013 American Community Survey (ACS) Public Use Microdata Sample (PUMS)** and are based on whether the head of household, spouse, or unmarried partner is a veteran. "

[http://www.huffingtonpost.com/jed-kolko/where-veterans-live\\_b\\_6134066.html](http://www.huffingtonpost.com/jed-kolko/where-veterans-live_b_6134066.html)



Household- and individual-level data are based on the. **2012 5-Year American Community Survey (ACS) Public Use Microdata Sample (PUMS)**

<http://www.citylab.com/housing/2014/08/where-private-school-enrollment-is-highest-and-lowest-across-the-us/375993/>



# Continue the Conversation #ACSData



Sign up for and manage alerts at  
<https://public.govdelivery.com/accounts/USCENSUS/subscriber/new>



[facebook.com/uscensusbureau](https://facebook.com/uscensusbureau)



[twitter.com/uscensusbureau](https://twitter.com/uscensusbureau)



More information on the American  
Community Survey:  
<http://www.census.gov/acs>



[youtube.com/user/uscensusbureau](https://youtube.com/user/uscensusbureau)



(800) 923-8282 or  
(301) 763-1405



[instagram.com/uscensusbureau](https://instagram.com/uscensusbureau)



[pinterest.com/uscensusbureau](https://pinterest.com/uscensusbureau)



- Purpose:
  - Improve understanding of the value and utility of ACS data.
  - Promote information sharing among data users about key ACS data issues and applications
- Membership is free and open to all interested ACS data users
- Webinars and special sessions at professional meetings planned
- Users group website and online community

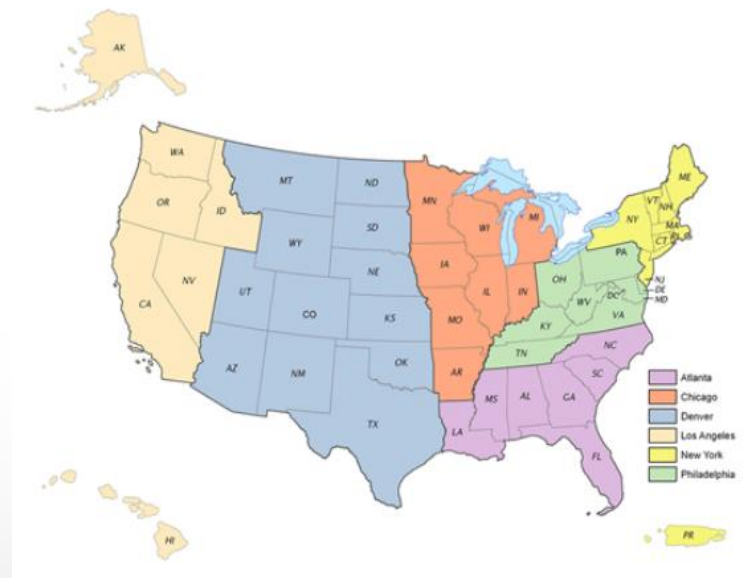
<http://www.acsdatausers.org/>

# Need Local Stats?

- Assistance Near You!

Our regional data staff can help you access local statistics from the ACS or offer training to help build your skills. Contact us at the following address:

[clmso.ddb.questions@census.gov](mailto:clmso.ddb.questions@census.gov)



# Questions?